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THE NINE-POINTS CIRCLE.

By MR. R. D. BOHANNAN, University of Virginia.

ABC is a triangle. A_a is the foot of the altitude from A . A_m is the middle point of the side opposite A . The altitudes intersect at O . A_0 is the middle point of AO .

From similar triangles BCC_a , BAA_a ,

$$\begin{aligned} BA_a : BC_a &:: BA : BC \\ &:: BC_m : BA_m; \\ \therefore BA_a \cdot BA_m &= BC_a \cdot BC_m, \end{aligned}$$

and therefore A_a, A_m, C_a, C_m , lie on a circle.

From similar triangles COA_a , CBC_a ,

$$\begin{aligned} CO : CA_a &:: CB : CB_a; \\ \therefore CC_0 : CA_a &:: CA_m : CC_a; \\ \therefore CC_0 \cdot CC_a &= CA_a \cdot CA_m; \\ \therefore C_0 \text{ lies on the circle } A_a, A_m, C_a, \end{aligned}$$

that is,

$$A_a, A_m, C_a, C_m, C_0 \text{ lie on a circle;}$$

Similarly,

$$A_a, A_m, C_a, C_m, A_0 \text{ " " " "}$$

Similarly,

$$A_a, A_m, B_a, B_m, A_0 \text{ " " " "}$$

These two circles have three points in common;

$$\therefore A_a, A_m, A_0, B_a, B_m, B_0, C_a, C_m, C_0$$

lie all on the same circle.



SOLUTIONS OF EXERCISES.

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The result

$$\frac{p^2q^2 + 4p^3r - 8q^3 + 2pqr + 9r^3}{(r - pq)^2}$$

is given as the equivalent of the function

$$\left(\frac{\beta - \gamma}{\beta + \gamma} \right)^2 + \left(\frac{\gamma - a}{\gamma + a} \right)^2 + \left(\frac{a - \beta}{a + \beta} \right)^2,$$